PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

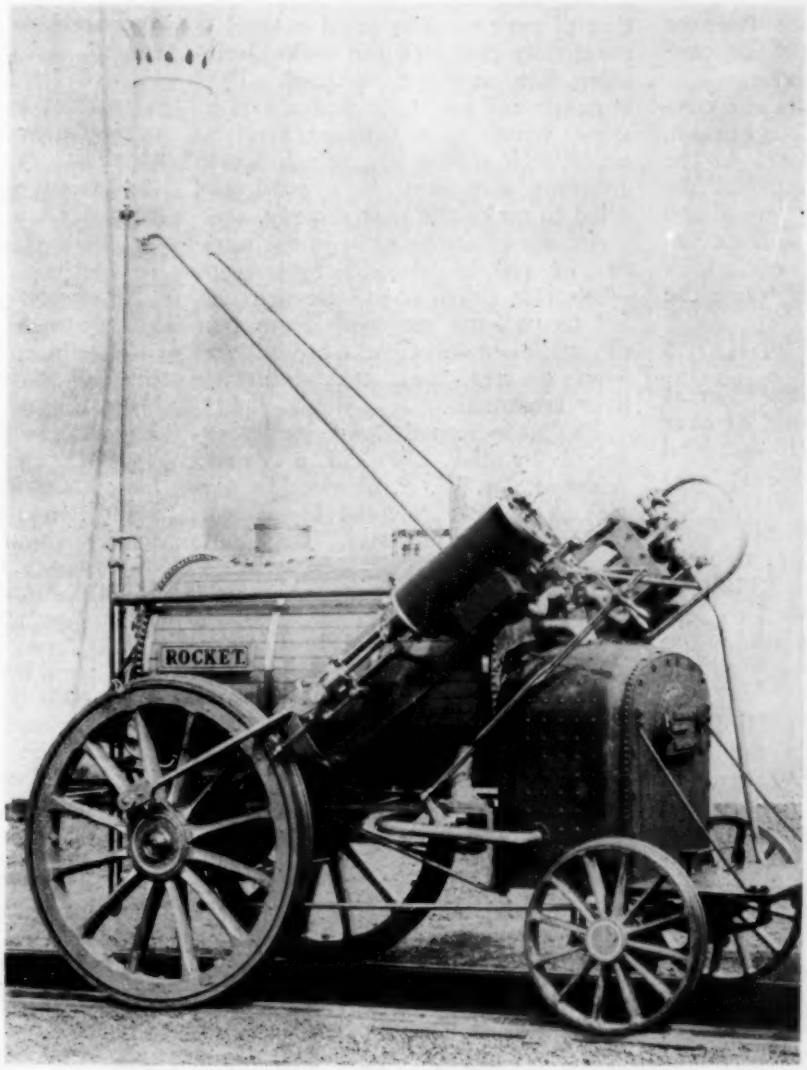
OCT 1 1929

SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

A SCIENCE SERVICE PUBLICATION

$5 a year 15c a copy September 28, 1929



THE NEWEST LOCOMOTIVE

Reincarnation of the Rocket for the Ford Museum

(See page 200)

Vol. XVI No. 442

Punch Here to Fit SCIENCE NEWS-LETTER Binder Cover
Sent Postpaid for 50 Cents in Stamps

Hog Stomach New Anemia Remedy

Therapeutics

Dried stomachs of hogs are soon to vie with livers as the saviors of sufferers from pernicious anemia. This newest anemia remedy, made from one of the few unused parts of hogs, has just been developed and announced by Drs. Cyrus C. Sturgis and Raphael Isaacs of the Simpson Memorial Institute for Medical Research of the University of Michigan, and Dr. Elwood A. Sharp of the Department of Experimental Medicine of Parke, Davis and Co.

An ounce of extract from the dried, ground stomachs of hogs is as effective a remedy in pernicious anemia as a pound of raw liver or three ounces of the most concentrated liver extract yet made.

This is the latest step in the conquest of a disease, pernicious anemia, which a few years ago was in the category of the unvanquished ills of mankind. In 1926 it was found that by feeding liver to anemia patients their red blood corpuscles could be increased. Liver, once the poor man's meat, increased in price rapidly. Then the active principle in liver was extracted so that anemia patients could take small doses of the extract instead of eating large quantities of the liver itself. Now comes the new and cheaper source of the anti-anemia principle.

The new extract from hog stomach is not yet commercially available. But it will be far cheaper than liver or the costly liver extracts on which pernicious anemia patients until now have been dependent. Hogs' stomachs are largely a waste product, finding only slight use in the production of pepsin. The dried extract is practically tasteless and looks something like sawdust particles. Beef stomach and ox stomach are sold as tripe, which is a familiar food to many. Hog stomach, which has a different structure, is ground and dried to make the new remedy.

An immediate increase in the number of red blood cells took place when this dried hog's stomach was fed to patients suffering from pernicious anemia. The increase was even greater than that following liver treatment.

The new remedy was partly inspired by the work of a British scientist, Dr. W. B. Castle. In pernicious anemia the red blood cells fail to mature properly. Dr. Castle demonstrated that the stomach of normal persons secretes a substance which could develop a blood-maturing principle from meat. Consideration of this led the University of Michigan scientists, Drs. Cyrus C. Sturgis and Raphael Isaacs, to test the effect of stomach tissue itself.

Working on much the same theory, Dr. Elwood A. Sharp of the Department of Experimental Medicine, Parke, Davis & Co., arrived at a similar decision. The three scientists then developed the new remedy together.

Dr. Sharp believes it likely that liver or liver extracts supply an essential substance which is easily formed from ordinary food in the normal stomach but which is imperfectly or scantily formed in the abnormal type of stomach found in the patient suffering from pernicious anemia.

Science News-Letter, September 28, 1929

Forest Fires Cost Millions

Forestry

Reports received by the Forest Service indicate that a total of over 650,000 acres of National Forest land has been destroyed by forest fires this year in the territory west of the Mississippi. The cost to the Government for emergency fire fighting measures has amounted to $2,100,000 in the short time from July 1 to September 10. That means that more than $20 is being spent every minute in the defense fund.

The only possibility of putting out the raging flames lies in the very faint chance of rain. Weather Bureau experts here do not believe that there is much likelihood that rain will come in the near future over western Washington and Oregon where the fires are the worst. The present forecast is for an increase of wind, without rain, which condition would only aggravate the present unfavorable weather state.

Science News-Letter, September 28, 1929

In This Issue—

Save the *whales,* p. 187—Economical skyscrapers, p. 189—*Vikings* of the Pacific, p. 190—*Whooping* cranes, p. 190—Explaining Saturn, p. 191—*Hemoglobin's* relative, p. 193—No liver substitute, p. 193—*Russian* National Parks, p. 194—Spitting at the *Sun,* p. 194—*Transatlantic* long distance, p. 195—Testing *wings,* p. 195—Curing *seedy* beets, p. 196—Much *lava,* p. 196—Conquering the *Pacific,* p. 197—Patching submarines, p. 197—*Cold!* p. 198—Timing *quakes,* p. 198—Enjoying tragedy, p. 198—*Grouse,* p. 199—The old is *new,* p. 200.

New Stone Age Village

Archæology

The site of a village dating back to the end of the New Stone Age has been discovered and excavated at Moedling, a picturesque town a half-hour's train ride from Vienna, and long a favorite haunt of artists. It stands on a low hill at a little distance from the town. Other relics of antiquity nearby date back to the Middle Ages and to a time in the Iron Age, about 700 B. C., so that the history of human settlement here now runs more or less continuously from 4000 B. C., the date of the newly-discovered village, down to the modern times represented by the town of Moedling.

Nothing much is left of the Stone Age settlement. Not even a post-hole shows where the houses were, but many blackened stones tell of hearth-fires, and fragments of pottery and broken stone and bone implements tell of housekeeping. One metal tool has been unearthed, a copper chisel.

Science News-Letter, September 28, 1929

SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

Advertising rates furnished on application.

Copyright, 1929, by Science Service, Inc. Republication of any portion of the SCIENCE NEWS-LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will be gladly sent on request.

Game Laws for World's Largest Beasts

Zoology

By Marjorie MacDill

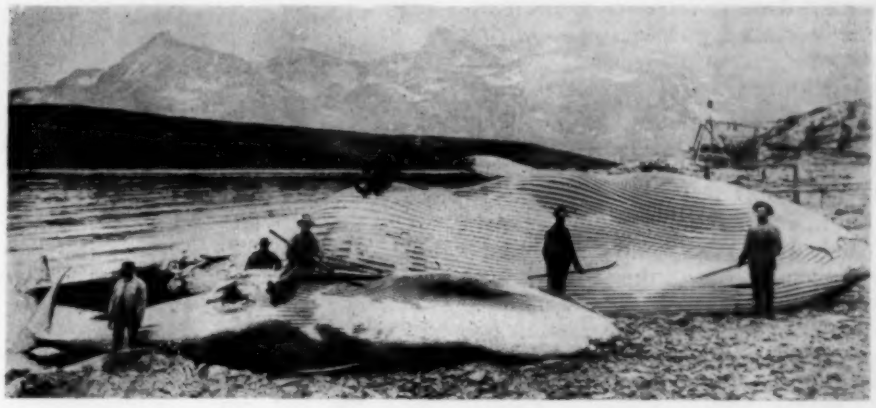
Suppose some seasoned explorer, trekking through the vegetative labyrinth of tropical South America, should penetrate a little deeper into an overlooked corner of the Amazonian jungle and actually find that fondest, most talked-of dream of modern naturalists, a lost world of prehistoric animals.

It is easy to picture the scramble of dignified scientific powers-that-be to raise funds to equip expeditions, and their efforts to secure by treaties and legislation an area of reserved territory where the monsters of the ancient world would be preserved for posterity. There would naturally follow the erection of field stations where members of the research staffs of biological institutions could study the great beasts at close range. Then a clamor would rise up from the zoos of Europe and America demanding a thirty-five ton brontosaurus for exhibition purposes, or at least a second choice of a stegosaurus, whose frill of three-foot armored plates down his spine would compensate in novelty to the Sunday crowds for his lack of brontosaurian bulk.

Unhappily the lost world remains the dream of a few visionary biologists and the actuality only of an imaginative movie director. But down at the lower end of the world there splash playfully about today in the Antarctic seas larger and more curiously complex monsters than any dinosaur that ever lolled in Mesozoic slime. And yet only within the last year have constructive steps been taken to save them from rapidly approaching extinction.

These marine mammals, that the lay world knows as whales, are being killed today in numbers that exceed the wildest dreams of any whaler of New Bedford, even under the influence of the liquor of his period. An important factor in the annual haul is the blue whale, the largest animal, so far as is known, that ever lived. None of the dinosaurs could rival in magnitude this giant, which attains a length of 87 feet and a weight of 75 tons.

Whaling in the Antarctic is an excellent example, going on in our own time, of what happened to the bison and the zebra, or of what takes place in the unrestricted hunting of any game that can readily be converted into cash money. The whale



FINBACK WHALES being cut up in Norway. Courtesy of National Geographic Society

is fair game to all nations, with no bar to the use of any invention that will deliver him up a speedy victim. The harpoon gun, pursuit by fast motor boats and steam trawlers, information by radio about herd movements, and airplane scouting have combined to run the kill up to 30,000 in a single year. The last word in efficient slaughter is a device which, by means of a light cable attached to a harpoon, electrocutes a whale as soon as he is hit.

Since whales produce only one offspring a year, it is not surprising that naturalists are beginning to wonder how long there will be any left, at the rapid rate they are going. Within the last year several prominent American scientists, realizing that something must be done, set about the organization of a council for the preservation of whales, under the auspices of the American Society of Mammalogists. This council will have as its immediate object the working out of a program of treaties between nations, and a set of regulations whereby it is hoped the killing of whales will be reduced below the danger point.

Some regulation is imperative, the scientists pointed out, if the very substantial revenue from the whaling industry is to be preserved at all. For it seems probable that it will only exterminate itself if the present short-sighted policy of indiscriminate killing is continued.

From the scientific point of view, the world could ill afford to lose these monumental beasts that have fled to the Antarctic in vain hope of escaping man's persecutions. Originally land animals, their adaptations to a sea-going existence are among the anatomical curiosities of biology. Some of them, like the great bristly strainers of baleen in the mouths of the whalebone whales, that sort out gallons of shrimps from a mouthful of sea water, were well known to the old time whalers. Other points, such as what have become of the whales' ears and hind legs in millenniums of aquatic life, have taken a goodly stretch of scientific time to unravel. Still other questions, such as how an air breathing animal can stay under water for an hour and somehow neutralize the effects of the poisonous gases generated in his lungs, are unsolved mysteries that men would profit much to solve.

The source of the whales' undoing lies today, just as it did in the heyday of New England whaling, in the thick coat of blubber that protects these warm-blooded animals from the changing temperature of the sea. Even then the world quest for oil had begun. To get it, Nantucket sea captains went out on three, four and five year voyages in search of the wherewithal for light and lubrication. Today whale oil goes into soap. Yesterday the whale's only contribution to feminine beauty was whalebone for milady's wasp-like waist. Nowadays his fat yields up glycerin for the cold cream and toilet soap for her complexion.

Under the magic wand of the organic chemist, whale oil turns into gold through many strange channels. Shaving soap, tooth paste, and cosmetics of many kinds all contain glycerin into which it may be converted. In Europe the hydrogenated oil is used in making lard substitutes and candles. Most of it, however, is made into soap. (*Turn to next page*)

Game Laws for World's Largest Beasts—*Continued*

The English manufacturers of a widely advertised brand of soap flakes maintain floating factories in the Antarctic for the purpose of securing their own oil at its source. Under modern management a single whale has a value as high as $7,500 to $9,000, while the estimated value of the entire fishery is around $30,000,000 annually.

Even in the exciting days when whales were harpooned by hand from small boats, the fishery was prosecuted with such vigor that they were becoming noticeably fewer. The growing scarcity made the long voyages of the New England whaling fleet increasingly expensive. During the Civil War many of the old whalers were burnt, captured or used for warships. These circumstances, along with the advent of the cheaper petroleum products, put a kink in the American whaling industry from which it has never recovered.

In 1864 Svend Foyn, a Norwegian, invented the harpoon gun, and there began a new era in whaling, though it was not until around 1870 that the advantages of the new weapon were conclusively demonstrated. Steam vessels replaced the oar propelled whale boats of cedar plank. These vessels carry a small cannon in the bow that shoots the harpoon bomb. The head of the harpoon is filled with powder exploded by a time fuse, releasing four prongs at right angles to the harpoon, thus forming a strong hold on the whale when the line is pulled taut. These developments rapidly led to the pursuit of fast swimmers like the blue and the fin whales that no old whaler ever "lowered" for because they swam too fast for any hand-propelled boat to catch. So whole species were opened up for exploitation that had previously been exempt.

Since the beginning of the twentieth century the greatest development of the industry has taken place in the Antarctic regions around the South Shetland Islands, the South Orkneys, the Falklands and South Georgia. The waters in this neighborhood abound in the shrimp and other minute forms of marine life upon which the great whalebone whales feed. According to Dr. Roy Chapman Andrews of the American Museum of Natural History, thousands of fin whales are present here, where there are dozens in other oceans.

Large numbers of whales present has brought about a great concentration of the fishery in the shadow of the South Pole that has led to the establishment of vast floating factories, the last word in modern efficiency in a venerable industry. These factories embody a reversion to the idea of trying out blubber on board. They are mother ships of from 12,000 to 17,000 tons with a capacity for carrying three and a quarter millions of gallons of oil, according to the U. S. Bureau of Fisheries, and are equipped with try works for converting the blubber into oil. They are accompanied by smaller boats, either steam vessels of from 150 to 180 tons or fast motor boats, capable of a speed of from twelve to fifteen knots, that do the actual chasing and catching and tow their prey back to the factory for cutting in and trying out.

THE RIGHT WHALE that helped keep grandmother slender, so called because it produced the longest and best whalebone and so was the right whale to catch

The floating factories were introduced by the Norwegians, who constitute the bulk of the personnel in the whole Antarctic industry. Just as in the old days of whaling, all hands share in the catch on a percentage basis, though nowadays this share is tacked on to a predetermined base pay. In successful years a mere deckhand may receive as high as $1,800 for a season, while the captain of a whale catcher may get as much as $25,000.

The factories are able to handle from six to eight large whales per day and as many as twenty small ones. The whales chiefly caught are humpbacks, blue whales and finbacks, and more rarely sperm whales. The latter are not considered sufficiently profitable to bother with, since they waste much of the crew's time by "sounding" for a longer time than other whales, and give more trouble when caught. The big blue whales yield around 75 barrels of oil apiece. The smaller fin whales and humpbacks give around 42 and 30 barrels respectively. Humpbacks are the preferred variety because they are easier to kill and handle than the others, though incessant pursuit appears to be making them wise to the game. They have apparently learned which is the business end of a catcher and, after sounding, come up in the rear of the boat instead of in front, staying a safe distance behind and adjusting their speed to that of the boat until the hunters give up the chase in despair as so much time lost. No gun is carried in the stern of the whalecatchers because of the danger of the whale line fouling the propeller.

Though whaling in the Antarctic is chiefly in the hands of the Norwegians, the territory containing the only safe harbors, that is South Georgia, the South Shetlands, Falklands, etc., belong to the British Empire. Consequently they are able to exercise some control of the industry by demanding licenses from each floating factory and by imposing a tax on the oil. The license is good for twenty-one years, according to information made available by Dr. Waldo Schmitt of the U. S. National Museum, who has recently visited the whaling grounds of the far south. The fee is $1,500 per season for one factory with two catchers. Each additional catcher costs $500 apiece, though the number is usually limited to three catchers for each mother ship. The oil tax amounts to $1.20 per barrel.

In spite of taxes and high wages the profits of the whaling companies are so large as to incite the prosecution of the fishery to a pitch of intensity never known before in the history of whaling.

The taxes collected by the British, which amounted for the calendar year of 1926 to almost a million and a half dollars, are being used for research on the natural history of whales. Two laboratory ships, the "Discovery" (*Turn to next page*)

63 Story Building Most Economical

Engineering—Economics

On a piece of city realty, with the land worth $200 per square foot, a 63-story building will yield the greatest return on the investment. With the land worth $400 a square foot, which is more nearly the value of land in the Grand Central Terminal region of New York, a 75-story building will pay best. The engineering difficulties of a building as high as 2,000 feet, or nearly 200 stories, could be overcome, but such a structure would not be economically feasible. Even a building of 131 stories would not return any net income.

These are some of the principle conclusions drawn from a study that has been in progress during the last two years, under the direction of W. C. Clark, New York economist, for the American Institute of Steel Construction. Many arguments have been advanced on both sides of the skyscraper question, but the Institute recognized that the decisive one would ultimately be whether or not the tall building is more profitable than the low one.

For the purposes of the study, the committee considered a specific site in New York near the Grand Central Terminal, on which the Lincoln building, of 52 stories, is now being erected. Plans were actually drawn for eight separate buildings on this location, ranging from 8 to 75 stories. These were of the setback type, required for high buildings by the New York zoning laws. Estimates of costs and income were made for each of these by experienced architects, engineers, builders, building managers and rental agents.

The eight-story building, they found, would cost $22,193,000 to build, and would yield but 4.22 per cent. on the investment, at a land value of $200 per square foot. The 63-story building, costing $39,100,000, would give a return of 10.25 per cent. For higher buildings the return decreases, becoming 10.06 per cent. for a 75-story building. Estimates made of returns on still higher buildings indicated that at 131 stories the net income would vanish. For higher land values, however, higher buildings are more economical. At $400 per square foot, the committee found, the 75-story building would give the greatest return.

From an engineering standpoint, Mr. Clark stated, buildings could be built up to 2,000 feet. This limit is imposed chiefly by the elevators, as the weight of the cables would become too large for greater altitudes. Also, he said, the normal human ear drum cannot stand an elevator speed greater than 1,500 feet per second. This speed would have to be attained for practical operation in a building of this size.

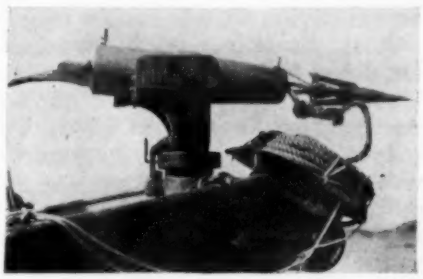
At present, the Woolworth Building, 792 feet, or 58 stories, is the world's tallest. The Chrysler Building, now under construction, will reach 808 feet with its 63 stories. The Chicago Tower, now contemplated, may ascend to 880 feet, with 75 stories.

Science News-Letter, September 28, 1929

Game Laws for World's Largest Beasts—*Continued*

and the "William Scoresby," maintained out of this income, have been cruising in the Antartic for several years trying to find out how whales live, where they go, and other questions that have bothered students of the giant cetacea for the last hundred years. The "William Scoresby" is still at sea, but the "Discovery" expedition ended in September, 1927, after examining 1,685 whales, the largest number ever investigated. The dissection of a whale makes more demands on the limitations of time and space than investigations on the anatomy of a frog or a rabbit or even a horse. A scientist needs literally all out-of-doors and a piece of the ocean for a laboratory when he is cutting up a beast that weighs from forty to seventy-five tons. In former years a naturalist was lucky if he ever managed to look into as many as six whales in the course of a lifetime. So the work on the "Discovery" has yielded generalizations about whales formerly impossible to attain.

It is now believed that the whale mating season occurs in the southern winter, that is in June and July. Most of the baby whales, some of them twenty-one feet long at birth,



THE HARPOON GUN instituted a new era in whaling

are born during the same season. Gestation is thought to require ten months. The mothers nurse their young for about five or six months, a period in which growth takes place at a terrific rate. Young blue whales, just weaned, were found to be between 45 and 48 feet long and the fin whale somewhat shorter. Whale's milk must contain potent vitamins or some other magic growth-promoting power, for the rate slows up considerably when the young whales have to rustle for their own food, the scientists found.

The myriads of minute forms of marine life, known as plankton, that float on the surface of the sea and furnish the chief bill of fare for the great whalebone whales, are thought to be an important factor in that unsolved mystery of the deep, the migrations of whales. Observations on the distribution of plankton were taken on over 2,400 miles of the "Discovery's" course. Further attempts to check on whale meanderings were made by means of numbered metal tags attached to the flukes of young whales. No recoveries of tags, however, have as yet been reported.

The task of working out an effective means for protecting the whale presents many difficult problems, since the giant mammals roam at large on the high seas, a circumstance that leads at once to international complications. Though whalers themselves realize that their industry cannot last much longer at the present rate of killing, each is unwilling to stop until he has positive assurance that the other fellow, representative of some other nation, will do likewise. To overcome this difficulty, the council for whale conservation is endeavoring to cooperate with scientists in other countries who will work toward interesting their respective governments in treaties and regulations to stop their complete extermination.

Science News-Letter, September 28, 1929

America Discovered By Islanders

Anthropology

By Emma Reh Stevenson

That America had commercial relationship with the Polynesian Islands before Columbus discovered America, is the theory of Dr. Paul Rivet, anthropologist and director of the Trocadero Museum in Paris, now in the National University at Mexico City as exchange professor.

A study of names of certain common objects and basic agricultural products show linguistic coincidences between Peru and Oceania. These are due, Dr. Rivet believes, not to a common tongue far in the background, but to a transmission of names along with the products from one continent to another.

Other evidence also points to relationships between the Pacific Islands and prehistoric America, such as folk legends and the finding of objects of undoubted Polynesian origin in America, reported at different times.

It has always been considered that the Pacific Ocean was impossible to cross until recent times. This belief has kept the theory of pan-Pacific relationships from being more widely adopted by ethnologists and geographers, Dr. Rivet said. Recent studies of mankind's seagoing history have, however, convinced him that the theory is not improbable.

The simplest form of primitive raft or boat gave man an advantageous means of transportation such as he did not evolve on land until much later. The tropical Pacific is generally calm, and historical and archeological evidence indicate that the west coast of South America was a great maritime region. The Peruvian art of working metals was thus transmitted from South America to Mexico.

Many South American legends and traditions tell of the arrival of strangers from unknown lands, and among the Indians of the Pacific coast there were tales at the time of the Conquest of lands across the Pacific. A Peruvian legend tells of the arrival of a race of giants from the west who came in boats of wood and cane fitted with triangular sails, who landed at Point Santa Elena.

While Dr. Rivet believes that these legends were undoubtedly influenced by the discovery of large animal bones which were originally thought to be human, they have nevertheless a foundation of truth in the arrival of strangers from the west. There also exist tales of the invasion of Chile by pirates from the East Indian Islands, and there is a reference to Oceanic Negroes on the coast of Peru. According to a historical tale, the next to the last king of Peru, Tupac Inca Yupanqui, had organized an expedition to the Pacific Islands.

With these pan-Pacific contacts, Dr. Rivet believes many cultural elements were transmitted from one continent to another, and that it is only a question as to who gave and who received. That the coconut only existed in a small area on the Pacific side of South America is suggested by the records of the earliest Spanish Conquistadores, and no reference is made to its existence anywhere on the Atlantic side. While this suggests a late introduction of the coconut to America, the recent discovery of the plant in pliocene and pre-pliocene layers in New Zealand show that it was native to the Pacific Islands.

The origin of other products like the yam and the calabash, existing both in America and Oceania, with names linguistically related in both regions, are still in doubt. Dr. Rivet suggests a complete inventory and study of such cultural elements. Many questions could be explained by the theory of commercial relations between America and Oceania, he says.

In a study of the clothing, food habits, agricultural technique, domestic industries, music, arts, games, religious and social customs, Dr. Rivet finds so many coincidences that he is convinced that the pan-Pacific peoples learned and adopted a great deal from each other. He finds the poncho of the Argentine Indian repeated in the native dress of Pacific Islanders, the terrace methods of agriculture of Peru like those of Japan, and the use of musical instruments like that of the conch-shell and reed tubes common to Americans and Polynesians alike, as well as practically identical customs of preserving the heads of dead enemies and inlaying of teeth. He finds pan-Pacific peoples playing the same games, using the same sort of domestic implements, and preparing food in the same way.

Science News-Letter, September 28, 1929

Whooping Cranes in Lousiana

Ornithology

Two whooping cranes, lone representatives of a species almost as extinct as the passenger pigeon, were seen by Dr. E. W. Nelson, former chief of the U. S. Biological Survey, on a recent trip along the coast marshes of Louisiana.

A hundred years ago whooping cranes, five feet tall standing, and almost pure white, used to fly over the prairies at migration times in vast armies. The clamor rising from the trumpeting of the vast hordes, early naturalists tell us, was almost deafening. Now, thanks to their size, conspicuous plumage and commendable flavor on the dinner table, they have virtually vanished.

Dr. Nelson declared, in a report to the Cooper Ornithological Club, that the Louisiana cranes were the first specimens he had seen in the field since 1870. At that time, he stated, eight and ten whooping cranes at a time might be seen hanging in the markets at Chicago, where they were considerably sought after by keepers of the larger restaurants.

According to local trappers, the pair seen by Dr. Nelson were the only ones in the region and had wintered in the marsh four successive years without rearing any young.

Science News-Letter, September 28, 1929

Spraying with Sea Water

Phytopathology

Sea water has a new role. The Agricultural Experiment station at Guam has found that it is a cheap and effective means of killing the countless insects that gather in the folds of young, partly opened leaves of trees and shrubs. Certainly there will be no difficulty about a source of supply of the new insecticide. Palm trees, especially, have been benefited by "showers" of several gallons daily.

Complete control of the scale insect infesting the cocoanut palm has been brought about, it is said, by the introduction of predacious lady bird beetles from the Fiji Islands.

Science News-Letter, September 28, 1929

CLASSICS OF SCIENCE: Huygens Explains Saturn's Ring

Astronomy

During the fifty years since Galileo had first called attention to the new beauties of the planets revealed by the telescope, the leading puzzle of the heavens was the succession of strange shapes assumed by Saturn. Huygens solved the problem with a more powerful telescope plus the exercise of his clear, common-sense imagination, to the confusion of his predecessors' wild theories illustrated below.

Cristiani Hvgenii SYSTEMA SATURNIVM, sive De causis mirandorum Satvrni Phaenomenon, Et Comite ejus Planeta Novo. Hagae-Comitis, M.DC.LIX (1659). *Translated for the* SCIENCE NEWS-LETTER *by Helen M. Davis.*

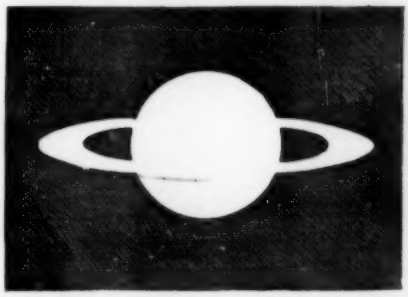
The Moon of Saturn

So on the day, according to the Gregorian Calendar the 25th of March, in the year 1655, about 8 o'clock in the evening, I saw Saturn with arms extended on both sides in a straight line; and pointing toward a little star *a* only a little distance from it toward the west, so placed that a line drawn through the extended arms would meet it, or at least would pass below it by a very small space. And on the other side, toward the east, was a little star *b*, slightly farther removed from Saturn, and much lower than the line of the arms. From this I at once suspected the star *a* of being a companion of Saturn, since it attended it closely and was almost in the same position.

Moreover the straight arms of Saturn were seen far extended, but the line at the extreme tips was a little thicker than at the place where they join the disc of Saturn, as the drawings show.

These forms persisted continuously until the setting of Saturn with the Sun. Similarly, after the other round phase of the year 1656 the arms reappeared with their form reversed, as it appeared through the 12-ft. telescope; then using the larger tube of 23 feet it was plain that this is the true figure; whence it was possible to believe that which formerly had seemed true, although through the smaller telescope it was impossible to see perfectly. But I noted, as with the 12-ft.. telescope, that faint line joining the extended arms and yet wholly separated from them below.

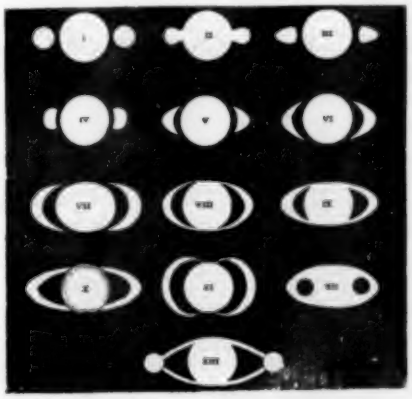
On the day following, namely the 26th of March, the star *a* in the same way as before was located a short distance from Saturn, while *b* was still further off than before. Whence, the distance between the little stars having become greater, it follows that either one or the other must be moving. And I judged this to be necessarily the star *a*, because Saturn at that time had begun to retrograde; and so it ought to be carried down in the same plane with Saturn, and ought to become much nearer it. In fact nothing opposed the belief that the other *b* was as I had judged a fixed star, on the other hand it was, as I estimated, unchanging, since Saturn had in one day withdrawn from it by so much as its motion demanded. Nor in truth have subsequent observations shown it otherwise.



SATURN'S RING as Huygens saw it

The Ring

When therefore I discovered that the new planet revolves around Saturn in a period of 16 days, I was persuaded that Saturn itself rotates about its own axis without doubt in a less space of time. For before that I had always believed that the other primary planets agree with our Earth in this, that each rotates about itself, so that its whole surface through this alternation rejoices in the light of the Sun. Furthermore in the universe among bodies to be compared in size with the earth, when the smaller are carried around by them, those in the center rotate in less time. So indeed its spots tell us that the sun makes its revolution in 26 days: around the sun each of the planets, among which the earth is placed, according as each is further removed, takes its course more slowly. Again the Earth turns daily through this space, while the Moon goes around with a monthly motion. Moreover the four lesser moons, so to speak, of Jupiter go around the planet according to the law that those which are nearer run their course faster. Whence Jupiter which is believed to rotate in perhaps a shorter time than 24 hours, approaches that of the fastest of its little moons with less than two days. I had known this for a long time, I now judged Saturn to have a similar motion. From the swiftness of period also, the observation of its companion made me sure. The fact that it completes its orbit in 16 days proves that Saturn, placed in the center of its orbit, rotates with greater frequency. Now in truth and from this it seems credible that all the celestial material thrown out between Saturn and its companion might be subject to the same motion, on this condition that the nearer it is to Saturn the more it accelerates in its motion. Whence it follows finally that the appendices or arms of Saturn, whether joined to the globular center of the body and fixed, revolving at the same time with it, or, separate with an interval between, must necessarily have a period not much slower.



AS SATURN LOOKED to earlier observers

Furthermore the shape of the arms, while I was troubled in mind about their motion, appeared just as was seen in the former observations in the year 1655. Namely, the body of Saturn was perfectly round, with arms truly on both sides, extending in the same direction in a straight line as if the axis were stuck through the middle of the planet, whereupon I used the 12-ft. tube, by which the extreme tips were shown a little thicker and clearer, where they joined the middle of the sphere, as shown in the first appearance. But when this same spectacle presented itself daily, I thought that in no other way could it be, so short was its revolution compared to Saturn's and to that of its companion, unless the globe of Saturn be girdled around equally on every side and so have a ring which surrounds it in the middle. Hence of course it will quickly revolve, keeping the same face al- (*Turn to next page*)

Saturn—*Continued*

ways toward us, if only the axis be perpendicular to the plane of the ring.

And thus the cause of the phase which persisted at that time established itself. Therefore I immediately began to ponder those appearances offered yearly by Saturn, as to whether they could be considered rings. This indeed succeeded rapidly from study, through frequent observations, of the arms of Saturn obliquely to the ecliptic. For when I ascertained the straight line in which they extend not to follow the path of the ecliptic, but to cut it at an angle greater than 20 degrees, I determined at once that the plane of the ring which I had imagined was inclined by about such an angle to the plane of the ecliptic. At a perpetual and constant inclination, evidently, in the same way that on our Earth this is known to cut the plane of the equator. Hence it also necessarily followed that the same ring appears to us in diverse aspects, now a very broad ellipse, now the same narrower, and sometimes at last a straight line. Since also handles appear, I thought this to be due to the fact that the ring is not joined to the globe of Saturn, but is removed from it on all sides by a space. From these things so arranged and also the inclination of the ring of which I have spoken being assumed, all the remarkable appearances of Saturn can be referred to them, as will presently be shown. And this is the very hypothesis which I gave out in the year 1656 on the 25th day of March in mixed letters with the observation of the Moon of Saturn.

For the letters were a a a a a a a c c c c c d e e e e e e g h i i i i i i i l l l l m m n n n n n n n n o o o o p q r r s t t t t t t u u u u u; which placed in the proper place mean this, *Annulo cingitur, tenui, plano, nusquam cohaerente, ad ecliptican inclinato.* [It is girdled by a ring, thin, plane, nowhere attached, inclined to the ecliptic.] The figure of Saturn as observed by others shows indeed that the space placed between the ring and the globe of saturn equals the breadth of the ring itself or even exceeds it, and more certainly afterward the figure as seen by myself: and also the greatest diameter of the ring obtained by this calculation is to the diameter of Saturn as 9 is to 4. Hence in truth its form must be reckoned such as I have sketched in the figure.

Science News-Letter, September 28, 1929

Progress in Microscopy

FIFTY-SIX years ago the Bausch & Lomb Optical Company placed on the market the first microscope that was within the means of the average scientist.

Since that time the progress of methods in manufacture has kept pace with the advance in the performance and quality of B & L instruments until now the FS microscope is available at an exceedingly reasonable price.

Yet you will find that the FS is a high-grade compound microscope. It is equipped with coarse and fine adjustments. The fine adjustment is of the B & L patented side lever type and ceases to act when the objective touches the slide. An iris diaphragm is provided.

Send for complete information on this and our other models for use in elementary, laboratory and research work.

Bausch & Lomb Optical Company

697 Saint Paul Street **Rochester, N. Y.**

Plant Color Related to Blood

Plant Physiology

Another step in the solution of two fundamental problems of plant and animal life has been taken by Prof. Kurt Noack of Bavaria who has just shown that chlorophyll, the green coloring matter of plants, is related to blood and is derived from a substance known to biochemists as protochlorophyll.

Chlorophyll is the most abundantly produced complex organic chemical compound on the earth upon which we live, said Dr. Frank M. Schertz of the U. S. Bureau of Chemistry and Soils in explaining Prof. Noack's discoveries.

The breaking down of the chlorophyll molecule releases energy that may be manifested in many different ways. Chlorophyll in some way as yet unknown to us is directly related to the dry weight of plants, to the mineral elements found in the soil and in the plants, to the organic compounds found everywhere about us, to the electromagnetic waves which come to our planet, and most mysteriously of all to every manifestation of life we find here on earth.

"A complete understanding of chlorophyll in all its relations will aid us greatly in understanding whence we come, and whither we go," he said. "Chlorophyll is so little understood, yet it is the most important compound in all the world. It seems to be derived from protochlorophyll, a peculiar red-fluorescing pigment which is produced in seedlings grown absolutely in the dark. Protochlorophyll changes photochemically into chlorophyll upon exposure to light. Chlorophyll is an oxidation product of protochlorophyll. It is with the origin of this vitally important substance, chlorophyll, that Prof. Noack's experiments are concerned."

The work of Prof. Noack has shown very clearly a relation between the green pigment found in leaves and the red pigment of blood, although just how the blood pigment is formed from the chlorophyll has not yet been determined.

How hemoglobin, the substance which givs the red color to blood, is formed from chlorophyll has been a a much disputed subject among scientists. Prof. Noack's experiments lend definite support to this theory. In the galls of animals that have been fed on green fodder is found phylloerythrin, a substance basically related to hemoglobin. On the other hand, this phylloerythrin, which is formed in the animal body from the chlorophyll of the green fodder, is chemically very similar to protophaeophytin in a direct derivative of protochlorophyll, the same pigment which constitutes the first step in the formation of chlorophyll itself.

The origin of chlorophyll, on which Prof. Noack's work touches, is the first of two problems very important in biochemistry, Dr. Schertz commented. When scientists find how protochlorophyll is produced, this first problem will be solved. The second problem concerns the way in which blood pigment is produced from chlorophyll. These two important problems must sooner or later be solved by biochemists as they are most fundamental in all plant and animal life.

Science News-Letter, September 28, 1929

Milk No Liver Substitute

Physiology

Attempts to increase the nutritional value of milk by the simple technique of giving cows and goats more copper salts in their food than they would normally have access to, has failed to work.

The valuable factor in liver, which has become the up-to-date physician's most substantial prop in treating pernicious anemia, was recently found by Dr. E. B. Hart and a group of investigators at the University of Wisconsin to be copper rather than iron, as was first believed. Liver, in the proportions necessary to produce curative effects, becomes an exceedingly disagreeable medicine to many patients. Other foods, consequently, that supply the needed element are highly desirable.

Naturally the Wisconsin investigators turned their thoughts to various ways of increasing the copper content in other foods. Milk, which in earlier analyses, showed from .38 to 1.4 milligrams of copper per liter, was found under carefully controlled conditions to have only .123 to .184 milligrams per liter, not sufficient to prevent rats, fed on a milk diet, from developing anemia. The earlier figures are believed to be the result of contamination with copper from metal vessels used during analysis.

Cows and goats fed on an experimental diet showed milk with the same proportion of copper as that found in the recent analyses. Increasing the copper content of their food even in considerable proportions, however, did not produce any increase in the amount of the element in their milk. So anemia patients can't look to milk for relief from liver.

Science News-Letter, September 28, 1929

Clock Tells World Time

Horology

A clock without hands that tells the time in any part of the world is one of the chief attractions among the American exhibits at the Ibero-American Exposition at Seville. The outer part of the dial shows the longitude for any part of the earth and an inner revolving disc is divided into the twenty-four hours of the day. The figure opposite any longitude gives the time at that place.

Science News-Letter, September 28, 1929

Intelligence and Skill

Psychology

Tests made at Cleveland of the manual dexterity of children of both normal and superior intelligence indicate that those of average mentality are equal to their brighter fellows in ability to work with the hands.

The tests were given by Dr. Frieda A. Kiefer, of Watertown, Mass., to a group of 95 superior children and another group of 97 children with normal "IQ's". The ages ranged from 8 to 12 years.

The tests were varied enough to show several different types of physical ability. One measured strength of grip; for this a galvanometer was used. Another measured the rapidity with which the child could tap on a telegraph key. Two tests measured steadiness of the hand; for these electrical devices were used so constructed that the slightest quiver of the hand holding a pencil would make a contact and cause a little click in the machine. The final test indicated the child's ability to control the movement of his hand; he was asked to move a rod a certain distance along a measuring rod, always stopping at the same place.

Science News-Letter, September 28, 1929

THE WISTAR INSTITUTE

BIBLIOGRAPHIC SERVICE

is of invaluable assistance to

Investigators—Librarians—Teachers

It brings to them, in AUTHOR'S ABSTRACT form, a brief review of all original papers on Biological Subjects which appear in the following journals:

Journal of Morphology and Physiology
The Journal of Comparative Neurology
The American Journal of Anatomy
The Anatomical Record
The Journal of Experimental Zoology
American Journal of Physical Anthropology
The American Anatomical Memoirs
Folia Anatomica Japonica (Tokio, Japan)
The Australian Journal of Experimental Biology and Medical Science (Adelaide, South Australia)
Stain Technology (Geneva, N. Y.)
Physiological Zoology (Chicago, Ill.)
Publications of the Biological Survey of the Mount Desert Region

Advance Abstract Sheets

Issued semi-monthly, bearing Author's Abstracts without bibliographic references, offer a practical means of making research immediately available in abstract form and of purchasing articles of special interest in reprint form without the necessity of subscribing to all the journals.
Subscription ..... $3.00 per year

Bibliographic Service Cards

with complete bibliographic references, printed on Standard Library-catalogue cards, are of value and assistance to Librarians and investigators.
Subscription ..... $5.00 per year

Abstracts in Book Form

Abstracts referred to above are brought together periodically in book form with Authors' and Analytical Subject Indices.
Price ..... $5.00 per volume
with liberal discount to regular subscribers to the Bibliographic Service Cards.

Subscriptions to the Bibliographic Service and orders for reprints should be sent to

THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY
Thirty-sixth Street and Woodland Avenue :: Philadelphia, Penna. :: U. S. A.

National Parks Now in Russia

Geography

Through the Institute for Natural Sciences, Soviet Russia has established nature reserves for safeguarding its wild life comparable to the national parks of America.

After the chaos of the revolution, when many of the rare animals of Russia preserved on the hunting estates of the Czar and the nobility were destroyed, considerable effort is being expended to restore the sable, sea otter, wisent and other fast-disappearing game to some semblance of their former numbers.

Prominent among the reserves set aside for protection is a tract of land of approximately 1097 square miles in the Caucasus where there flourished formerly a herd of wisent, an old-world cousin of the American bison, now thought to be extinct, except for a few zoological park specimens. When the grand dukes held hunting reserves in this region there were about 700 of them. A scientific expedition, sent there recently, failed to find a trace of this herd. The ibex, of alphabet-block fame, still survives in this section, however.

A small park of about 55 square miles has been established at Ilmen, one of the most beautiful parts of the Urals, said to contain a natural collection of 150 different kinds of precious and semi-precious stones.

At Astrachan in the Volga delta is a bird preserve of 88 square miles. A somewhat smaller area in the Crimea has been made a preserve of moufflon and various kinds of deer. A rest station for migrating birds has been located in a marshy region midway between the Caspian Sea and the Arctic. Besides these there are many other small government reserves, notably the estates of the writers Tolstoi and Pushkin, and the island of Kondo in the White Sea set aside for the eider duck.

In spite of the national interest in parks, the game laws, promulgated in 1924, still leave much to be desired. Under this edict it is made more or less a public duty to kill the larger predatory animals such as leopards, lynxes and wolves. Some of the former are extremely rare and might well enjoy a closed season. The eagle and various other rare birds of prey have also been put in this category.

Science News-Letter, September 28, 1929

Cave Man's Brain Found

Anthropology

A rare find of human brains, representing our ancestors thousands of years ago, has been announced from Odinzowo, near Moscow, in central Russia. The two petrified brains were found associated with the teeth of a woolly mammoth, and they are without doubt the very oldest fossilized human brains ever found.

It is reported that a commission of scientists has been selected to make detailed studies of these remarkable finds of man during the ice age when the huge mammoths and the rhinoceros were clothed with a thick coat of wooly hair.

These rare finds are not "casts," but actually petrified human brains—somewhat shrunken, to be sure, but sufficiently well preserved so that anatomists can reconstruct the form of the brains from the fossils.

The cave man was equipped with a goodly supply of gray matter. The Russian scientist, Hindze, who is preparing a report on the fossil brains, is of the opinion that man in the ice age possessed a brain slightly smaller and less developed than recent dwellers of the same area.

Science News-Letter, September 28, 1929

Duck Holds Breath

Zoology

Diving animals like ducks and muskrats can be induced to hold their breath until they die from lack of oxygen. This strange phenomenon has been observed by Dr. Theodore Koppanyi of Syracuse University.

The nerve endings of the reflex that controls holding the breath are in the nostrils, Dr. Koppanyi said, since pouring water over the nostrils induces it in both the duck and the muskrat. Besides this submergence apnea, as the feat of holding the breath is technically known, there is another respiratory adaptation in diving birds and animals by which apnea can be brought about by bending the head back on the neck while the animal is lying on its back. Complete suspension of breath for ten minutes has been observed in this position, the scientist declared.

"It is actually possible," he said, "to kill the duck by maintaining this postural apnea until the animal dies from lack of oxygen."

Science News-Letter, September 28, 1929

Practically all of the iodine in the human body is stored in the thyroid gland.

Ocean Telephone Cable by 1932

Communications

Early in the year 1932, it will probably be possible to talk from the United States to Europe by telephone regardless of the static and atmospheric conditions that interfere with trans-Atlantic radio at times. By then it is expected that a trans-Atlantic telephone cable will be in use, providing an all wire voice circuit between the two continents.

Engineers at the Bell Telephone Laboratories here are now working on the development of the cable system, which will connect New York with London. Long distance lines will radiate from each of these cities to the other parts of Europe and America. It is not expected that the cable will replace the present radio system, but its greater reliability will assure a connection at all times. It will also provide an additional channel so that more messages can be handled at once. The telephone cable will only handle one conversation at a time.

Recently developed alloys of nickel, cobalt and iron make telephony by cable possible. This metal is known as "perminvar." It is not used to carry the currents that traverse the cable, but is wrapped spirally around the cable as loading. A copper wire in the center is the actual conductor.

With a plain copper wire, which was used in the first cables, the wire and the sea outside acted as a condenser, even though the wire was fully insulated. Electricity is stored in a condenser something like water in a tank, so it is sluggish in its action. The condenser, which is the entire cable, must be charged before the operator at the other end gets a signal, while it must be discharged before another signal can be sent. This made early cable transmission very slow.

This capacity of the cable—the property that makes it a condenser—can be overcome by loading it. This is done by wrapping it with wire or tape made of metal which becomes magnetized by the slight currents flowing through the cable. For use in telegraphy, the Bell Laboratories developed an alloy called "permalloy," which is now in use on several high speed cables. These cables respond instantly to signals from the transmitting end.

Perminvar has a further advantage over permalloy, however, for it is affected the same extent by the same variation in current, whether in a weak current or a relatively heavy one. With telegraph cables, the current either flows or does not flow, and the change is from on to off so this property is not needed. Telephony, however, requires a wide range of current strength, to take care of the modulations of the voice. With a cable loaded with perminvar, this is possible.

The route of the new cable has not yet been definitely determined. Probably, the submarine part will be from Newfoundland to Ireland, a length of about 2100 miles. From Newfoundland, the circuit will be carried through several other cable sections to Nova Scotia and thence over land wires to New York. From the Irish end, a submarine cable will carry it across the Irish Channel to Scotland, and thence land wires will take it to London.

Science News-Letter, September 28, 1929

Airplane Tests in Progress

Aviation

Tests of airplanes entered in the Daniel Guggenheim Safe-Aircraft Competition are now under way at Mitchel Field, on Long Island, and will continue during October as rapidly as the 25 entrants present their ships. A Handley-Page airplane, equipped with the slotted wing that is said to be a great aid to safe operation, is now en route from England, and will probably be tested within the next few weeks. The autogiro, with its windmill-like wings, is also entered.

The requirements which the planes must pass are very drastic, but they are designed to insure extraordinarily safe operation of a plane that can meet them. It must be able to maintain level and controlled flight at a speed of not more than 35 miles per hour, a condition which few present day planes can meet. It must be able to land in a straight line with all power turned off, coming to rest within 100 feet of first touching ground. It must be able to clear an obstruction 35 feet high, and land within 300 feet of the base of the obstruction. In taking off, it must leave the ground within 300 feet of a standing start, and clear a 35 foot obstruction 500 feet from rest. It must be able to take off and land within an area 500 feet square, surrounded by a 25 foot wall. For safety in making the tests, the wall will be imaginary.

Other tests relate to the plane's stability, controllability and ability to recover from abnormal conditions. The entrant whose plane best passes the test will receive the main prize of $100,000, while each of the first five entrants whose planes pass the test will be awarded a $10,000 safety prize.

Science News-Letter, September 28, 1929

Sleep Like Kitten

Psychology

Movies taken of sleepers indicate that the greatest possible relaxation occurs when the individual coils himself like a kitten and when he sprawls out like a swimmer. This new evidence on sleep is announced by Prof. S. R. Hathaway of Ohio University.

Science News-Letter, September 28, 1929

Patina From Coal Acids

Chemistry

The green patina that appears on copper roofs or drainpipes after years of service and that gives the metal its attractive appearance, is due chiefly to sulphuric acid present in the air from coal smoke. This conclusion was announced at the Düsseldorf meeting of the Institute of Metals, an English society that just held its first meeting in Germany, by Dr. W. R. J. Vernon and L. Whitby, of the Chemical Research Laboratory at Teddington.

The two metallurgists studied samples of copper from buildings in London and other parts of England. Some were as old as three hundred years. In the city specimens, the patina consisted of basic copper sulphate, caused by the action of atmospheric sulphuric acid. A piece of telegraph wire, exposed for 13 years within 200 yards of the sea, showed a patina consisting of basic copper chloride, the chlorine having been furnished from the salt water. At first, they found, the red copper turns black, but then the green patina develops later, and remains indefinitely.

Science News-Letter, September 28, 1929

Beets Cured of Going to Seed

Plant Physiology

Sugar beets, mangolds and other root crops whose tendency to go to seed early is as troublesome to the planter as broody hens are to the poultryman who wants eggs, have been cured of their bad habit by the paradoxical method of encouraging them in it. This has been disclosed by a study of the experiments of the late William Bateson, director of the John Innes Horticultural Institution and one of the world's leading students of genetics and evolution.

Sir A. D. Hall, present director, explains that the tendency of beets and similar crops to produce seed during the first year's growth is an expensive waste, for every beet that does it is lost so far as sugar-making or cattle-feeding is concerned. This habit is called "bolting." Sometimes five per cent. or even more of a field of beets will prove bolters.

The cure consisted in exposing prospective seed beets to extreme temptation to bolt, and then selecting the stable individuals that were able to withstand the impulse as the progenitors of the next seed generation. Seeds from the commercial strain to be experimented upon were sown under glass in December or January and the seedlings were planted out about the middle of April, when another lot of the same seed was sown in the open. Most of the planted out seedlings would bolt but the few which did not would be stored and planted out the following season to produce seed.

The results for Golden Tankard mangold are typical. From seed sown under glass in December, 1915, 25 plants were obtained of which eight were nonbolters. Their seed did not bolt when sown in January, 1918, nor again the next generation. Even so this seed was still not entirely freed from bolters, for when it was tried out more severely still, i. e., sown December 20, 1920, when a year old, it yielded 7 bolters from 737 plants. After this further selection three generations gave no bolters from January sowings, nor any naturally in the open.

Sugar beet was not so readily freed from bolters. A particular strain at the outset gave 70 per cent. bolters under forcing, 63 in the next generation, and 71 per cent. in the second. In the third generation, however, no bolters were obtained from a total of 326 plants.

Science News-Letter, September 28, 1929

Brief Eruptions Spout Much Lava

Volcanology

How much lava a volcano can disgorge, even in short-lived eruptions, is indicated by calculations by Dr. Howard A. Powers, of the Hawaiian Volcano Observatory in Hawaii. A cubic box, one and one-sixth miles on each side, would be required to hold the lava that has been left in the inner pit of the Halemaumau volcano in the three brief eruptions that have occurred since 1925. These figures have enabled the volcanologists to predict another eruption this fall.

In the period since 1925 a total of 8,692,000 cubic yards of solidified lava has been left in the pit, filling it to a depth of 210 feet. Actually, Dr. Powers has found, even more lava than this has been given out, but some of it sank back after the eruptions. For instance, the last contribution began last July 25. This eruption brought a total of 136,850,000 cubic feet of molten lava into the pit, but when it subsided, only 97,350,000 cubic feet of the solidified lava remained.

The previous eruptions in the period measured were in July, 1927, which left 85,430,000 cubic feet of lava, and in February, 1929, when 51,900,000 cubic feet additional remained.

From these data, Dr. Thomas A. Jaggar, director of the observatory, has formed the opinion that "the intensity of gas action and the freedom of flowing has increased in 1929, and at the same time the interval between outbreaks has decreased."

Dr. Jaggar has plotted a curve of the outbreaks, and this makes it appear, he said, that "the next inflow of lava should take place some time between now and November, 1929. This expectancy might be interfered with if Mauna Loa should erupt, but that would be an equally satisfactory demonstration that the Hawaiian lava column is alive."

Science News-Letter, September 28, 1929

A typewriter on which music can be typed is the invention of an Italian musician.

Staff of Science Service—Director, Edwin E. Slosson; Managing Editor, Watson Davis; Staff Writers, Frank Thone, James Stokley, Emily C. Davis, Jane Stafford, Marjorie Van de Water; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Board of Trustees of Science Service—*Honorary President*, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; D. T. MacDougal, Director, Desert Laboratory, Tucson, Ariz.; Dr. Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, John C. Merriam, President, Carnegie Institute of Washington; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, California; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, *Vice-President and Chairman of Executive Committee*, Permanent Secretary, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithon, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

BINDER COVERS

for

Science News-Letter

Many subscribers have expressed a desire for a convenient binder in which to file their copies of the *Science News-Letter*. We therefore have prepared an attractive and durable loose-leaf binder-cover of gray leather-like stock, printed in dark green and complete with fasteners. Each binder-cover will hold one volume (six months or 26 issues).

To facilitate punching the issues of the *Science News-Letter* to fit this binder-cover, a pattern showing where holes should be placed appears each week on the back cover page.

To obtain a binder-cover, send 20 cents in stamps (make them 2s, please), together with your name and address (please print) to

SCIENCE SERVICE

21st and B Streets

Washington, D. C.

Rare Lizards in New York

Zoology

Two specimens of the northern skink, a lizard hitherto unknown in western New York, have been captured and brought to the Buffalo Museum of Science. One of them has added to the interest of the discovery by laying six eggs in captivity. The eggs are 2½ inches wide, 4½ inches long, dull white, and soft-shelled.

Gardiner Bump, assistant curator of education at the Buffalo Museum of Science, Buffalo, New York, while on a field trip with some members of one of his evening science classes, found at Bergen Swamp, near Batavia, what is believed to be a northern skink.

Two of the lizards were caught in their native habitat underneath fairly wet stones under a rotten log. One of them had cast off his tail, put part of this has been regenerated since he took up his abode in Buffalo.

This is the only record of a lizard found west of Geneva, N. Y. Thirty years ago another lizard was found in Bergen Swamp, but not of the same species as the present find. The northern skink is related to the famous chameleon and has the power to change its color.

Science News-Letter, September 28, 1929

Science Conquest of North Pacific

Oceanography

Canada and the United States from the east, Japan, China and Russia from the west, will meet in mid-Pacific in less than ten years with a well-rounded preliminary picture of the biology and physical oceanography of the northern section of that great ocean. This is the prophecy of Dr. T. Wayland Vaughan, director of the Scripps Institution of Oceanography, made after a survey of the programs of ocean science now embarked upon or contemplated by the powers bordering upon the North Pacific.

Currents, tides, winds, air and water temperature—all the complex phenomena that interact to make climate in air above, and what might be termed "water climate" in the aquatic element beneath, form one part of the program. The geology and geography of the solid land that forms the shores, and of the deep-drowned rocks that make up the ocean basins, jutting up here and there as islands or volcanoes, occupy another section. Then there are the multitudinous forms of life that swim as fishes and whales, or float as sea-jellies and protozoa, or cling and creep on the bottom, as well as the plant life, ranging from microscopic single cells to hundred-foot kelps, on which the animal life ultimately depends. A fascinating and challenging group of problems can be found where biology becomes geology, that is, in the formation of coral islands and reefs.

All these phases, and others besides, are actively under way in the North Pacific area, and it is here that the most rapid advances may be expected, according to Dr. Vaughan. Promising initial steps are being taken in the southwestern Pacific also. As yet little has been done in the southeastern section of the ocean, although some of the South American countries, notably Chile and Peru, have evinced interest and may eventually bring the scientific knowledge of their oceanic "spheres of influence" up to the level of that attained in regions where scientists have had an earlier start.

Science News-Letter, September 28, 1929

Delusions of Grandeur Vary

Psychology

Delusions of grandeur are twice as common among men as among women, according to a study of patients in Chicago Psychopathic Hospital reported by Dr. Irene Sherman.

Studying patients who believed themselves to be famous characters of history and personages of great importance and power, Dr. Sherman found that the men were most frequently obsessed on the subject of money and business. Delusions of being financial geniuses were twice as common among American-born men as among foreign men. Not one woman patient believed herself to be a lady of great wealth. The women were more apt to be obsessed with delusions of great religious powers.

Men of foreign birth tend to become deranged particularly on the subject of their professional or religious abilities, the psychologist reported. Delusions of grandeur are more frequent among the people of clerical and professional classes than among domestic workers and laborers.

The investigation sheds light on the subjects which affect the sexes and different nationalities intensely to the point of mental unbalance.

Science News-Letter, September 28, 1929

Bus Drivers Tested

Psychology

Paris bus drivers who apply for driving licenses are now required to face a strange piece of apparatus, with a stranger name, the "perceptotaquimeter." The inventor, Prof. Emilio Mira of Barcelona, recently arrived in this country.

The prospective driver is seated fifteen feet away from a table on which three rods are rigged so that they can be moved at varying speeds and in different directions. If the driver can estimate quickly and accurately the time at which the rods will meet, he is considered a good risk at estimating the speed of passing street cars, autos, dogs, and other traffic hazards.

Science News-Letter, September 28, 1929

The average length of a rural free delivery mail route in this country is 30 miles.

Russian Lake Like Well

Geography

A lake that is really a well, being deeper than it is wide, has recently been investigated by Russian geologists. It lies about 40 kilometers south of the health resort of Nalchik in the North Caucasus, and is known as Cerik-köl, or the Blue Lake.

It is only a small body of water, being 235 meters long and 130 meters wide, but it has the surprising depth of 258 meters, with practically vertical walls. Except at its surface, the water temperature remains constant the year round, at about 17 degrees Fahrenheit higher than the average annual temperature of the air. The lake has no surface inlets, not even the smallest of brooks, but a little river flows out it. The water is presumed to come from subterranean springs.

The lake is charged with hydrogen sulphide and also contains gypsum, so that nothing can live in it. There are never any leaves or pieces of driftwood to be found on its surface, which has given rise to the local superstition that nothing can float on its water. The people of the neighboring highlands also believe the lake is inhabited by a monster in the form of a bull.

Science News-Letter, September 28, 1929

Bones as Artists' Tools

Archæology

The discovery of ornamented pottery that belonged to prehistoric inhabitants of Britain, and buried near the pottery a small bird bone, has set an archæologist, Miss Dorothy M. Liddell, on the track of what sort of tools were used by Stone Age artisans in impressing designs in clay household ware. The bird joint fits neatly in the pattern of the pottery, she reports in the current issue of *Antiquity*.

It has been supposed that irregular pieces of stick must have been the customary stylus used in decorating such pottery. Leg bones and wing bones of such birds as the rook, magpie, pigeon, blackbird, and goose provided irregular joint ends capable of making a wide variety of the designs popular in Stone Age art. Miss Liddell's investigation has demonstrated.

Science News-Letter, September 28, 1929

Dogs and cats suffer from attacks of as many as 475 species of insect parasites.

Find New Cold Spot in Siberia

Climatology

In the northeastern corner of Siberia, Prof. S. W. Obrutchev of the Russian Academy of Sciences and a party of fellow scientists have been seeking colder places than any that have previously been reported to science.

Two years ago Prof. Obrutchev, on another exploring expedition in the district known as Oimekon in northeast Siberia, found a region where comparative temperatures were lower than those at Verchojansk, up to the present time the acknowledged pole of cold. Verchojansk is roughly 500 miles distant in a northwesterly direction from the new cold spot and well within the Arctic Circle. The new cold area lies slightly below the circle in the temperate zone.

When the explorers set out the first time they did not anticipate such extreme cold and had not included alcohol thermometers in their equipment. Consequently, they could not take observations below minus 39.4 degrees Centigrade, or 48.9 degrees Fahrenheit below zero, the point at which the mercury thermometers froze. They stayed frozen, however, for 12 days, during a period in the month of November when, it was ascertained, such temperatures only lasted for two or three days at a time at Verchojansk. In October they found that daily temperatures averaged about nine degrees Fahrenheit below that of Verchojansk. The lowest cold temperature officially recorded for the latter place is 90 degrees below zero Fahrenheit.

If confirmatory data on these temperature relations are gathered on the present expedition, it will be apparent that the area of the world's coldest regions extends much farther to the southwest than was previously believed, a fact of considerable importance in making meterological studies. Isotherms which were previously disposed in rings around Verchojansk must be transferred to include the region around the Okhotsk Sea.

Science News-Letter, September 28, 1929

Radio Checks Earthquakes

Seismology

The dots and dashes of radio transmission from an ordinary commercial station are now checking the times of southern California earthquakes. At the Seismological Laboratory of the California Institute of Technology at Pasadena, the code messages from the station are continually rereceived, and recorded by a flashing light on a revolving sheet of photographic paper. An accurate clock is recorded on the same sheet, so that the exact time of any dot or dash may be determined.

Scattered throughout southern California are a number of other seismograph stations, cooperating with the central station. At each of these is a similar automatic radio recorder, continually taking down the messages of the station. A clock, in which accuracy is not essential, records its ticks on the same sheet with the radio records. The same clock makes similar marks on the sheet on the seismograph drum, where the earthquakes are recorded.

In use, this permits the seismologists to tell the exact time at which the earthquake waves reach any station. For instance, suppose an earthquake record begins while the station is sending the word "ship". At Pasadena the record starts on the letter "s", while at Santa Barbara it begins on the letter "h." As the signals arrived at both stations simultaneously, the difference is due to the greater time it takes the wave to travel to Santa Barbara, and from the records of the standard clock at the central station this time may be precisely measured.

From the studies thus being made, it is planned to detect even the slightest tremblings of the earth in this region. From this it is hoped that enough may be learned of the dangers, so that proper precautions can be taken to prevent damage by earthquakes, or that a severe quake might be predicted sufficiently far in advance to prevent loss of life.

Science News-Letter, September 28, 1929

Wonders of Chemistry

Chemistry

QUOTED in *Journal of Industrial and Engineering Chemistry* from the *New York Times*:

Maud Muller, in this chemic day,
Far from the meadow sweet with hay,
Treats herself to a coat of tan
Out of a cute, convenient can.
Give her a can of tan, and soon
She has an August brown in June.
No more of looking broiled till fall,
No freckles, blisters, burns at all.

Science News-Letter, September 28, 1929

Enjoying Tragedy

Psychology

The actress who weeps through a tragic love scene and has her audience weeping with her is probably thoroughly enjoying the evening's work. The actor who is so despicable a character that the audience yearns to come up on the stage and take a hand in his downfall probably has no feeling of repugnance toward his part in the drama.

This personal relation of the actor toward his roles has now been studied by a psychologist, Prof. John T. Metcalf, of the University of Vermont. He has found that the actor enjoys his work when he is satisfied with his art, and his work is unpleasant when he feels his own shortcomings.

To what extent an actor feels the emotions he portrays has long been a matter of interest and dispute. Prof. Metcalf has concluded that the actor does imaginatively identify himself with some person and situation outside of himself. And the more fully he is capable of this, the more successful he will be in conveying the desired effect on the audience. But if he begins to experience the real sensations of anger or sorrow, he slips up in his art, for then he is behaving in a real and practical way instead of using his art to represent an imagined situation in the realm of unreality.

Science News-Letter, September 28, 1929

First Glances at New Books

THE LIVING AGE—New York ($6 a year). *The Living Age* goes through more metamorphoses than a butterfly. It was known to our fathers in sober and solid form and rather dingy looking as *Littell's Living Age*. Then it appeared for several years in a bright and neat and handy size. A year ago it flared out into a large magazine form with a pictorial cover in colors. But with the September, 1929, issue it is cut down to a compromise form, not so convenient as the original but not so unwieldly as the recent form. Each number has a color frontispiece.

Literature
Science News-Letter, September 28, 1929

LUCK—Lothrop Stoddard—*Horace Liveright* ($2.50). The trouble with this book is that the author doesn't know what he is talking about. He has no clear conception of his theme. He mixes up mascots with the mathematical theory of probability and so confounds superstition and science. The ill omens of black cats, thirteen and Friday have nothing to do with the number of times the ball falls into the red at roulette, or the calculation of average expectation of life by the actuaries of insurance companies. But the book contains a lot of amusing personal anecdotes of the curious coincidences and incalculable contingencies that occur in every career.

General Science
Science News-Letter, September 28, 1929

THE PROCESS OF HUMAN BEHAVIOR—Mandel Sherman and Irene Case Sherman—*Norton* ($3). Describes the making of a human being, what equipment of nerves, and sense organs, and reflexes a baby brings into the world and how that equipment develops, according to its possibilities, into emotions, intelligence, personality, and social behavior. The authors base their discussions on experimental work with infants in hospitals and at the Washington Child Research Center.

Physiology
Science News-Letter, September 28, 1929

THE HUDSON BAY REGION—F. H. Kitto—*Canadian Department of the Interior* (Free). One of the last of America's great frontiers is the Hudson Bay Region and this official Canadian governmental pamphlet contains valuable data on natural resources, mining, development and transportation.

Geography
Science News-Letter, September 28, 1929

PETROLEUM DEVELOPMENT AND TECHNOLOGY 1928-29—Petroleum Division—*American Institute of Mining and Metallurgical Engineers* ($5). Supplying America with gasoline, lubricants and all of the other products of petroleum is a great industry. In the sessions of the American Institute of Mining and Metallurgical Engineers the latest development in petroleum technology are revealed. This volume brings together the reports to the Institute during the past year.

Petroleum Technology
Science News-Letter, September 28, 1929

GEOPHYSICAL PROSPECTING 1929—*American Institute of Mining and Metallurgical Engineers* ($5). To have eyes that see into the depths of the earth has always been the dream of the miner or prospector. Geophysical prospecting has come as an answer to his need as a result of his endeavor. Electricity, magnetism, gravity and artificial earthquakes are used in geophysical explorations, and this volume reports and brings under one cover essential and current information on this latest mining aid.

Geology—Mining
Science News-Letter, September 28, 1929

POVERTY—R. W. Kelso—*Longmans, Green & Co.* ($2). The pressure of population upon available means of subsistence is considered by the author to be fundamental among the causes of poverty. But this volume recognizes many other causes for the "fungus upon the surface of decay" which we are told rose almost with the gnawing of the first empty stomach. Attempted and supposed remedies are also described.

Sociology
Science News-Letter, September 28, 1929

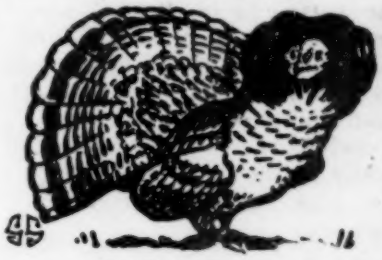
THE MYSTERIES OF BRITAIN—Lewis Spence—*McKay* ($3.50). Deals with the Druids, and particularly with debatable questions as to the mystic philosophy and the extent of influence of the cult. It is argued that Druidism arose out of a Cult of the Dead, which had its place of origin in northwest Africa and its date of origin in the late Stone Age.

Ethnology
Science News-Letter, September 28, 1929

NATURE RAMBLINGS

Natural History

By FRANK THONE



Ruffed Grouse

With the approach of the shooting season, hunters in many places will remember with a pang that they could once find ruffed grouse—or as the bird is less accurately but still very widely known, partridge. Now the coverts are not amply stocked anywhere, and there are many parts of the country where the younger sportsmen have never seen a ruffed grouse fly.

The disappearance of the grouse is lamentable, though not beyond remedy. It simply involves the correction of the factors that caused the diminution in numbers of this fine bird. The most obvious and direct enemies of the grouse have been beasts and birds of prey, headed by that most deadly of all predatory mammals, man-with-a-gun. Closed seasons, game sanctuaries, and bag limits are doing something toward helping this trouble toward elimination.

A second factor is more serious. The grouse is a bird of brushy country; it does not like nice, clean-floored, parklike timber lots, and it simply can not survive in well cultivated fields. Of course, it is out of the question to surrender economic farm and timber lands to a game bird; but some of the marginal land that should never have been cultivated at all is now automatically reverting to brush and small-timber areas, which will make good hunting land if the grouse can be re-introduced.

The third trouble with the grouse has been diseases, which have made it impossible to rear the bird in captivity, as the foreign pheasants have been. But lately a young ornithologist at Cornell University, named Arthur A. Allen, has made much progress toward solving this difficulty, and it may be that eventually we shall have grouse farms just as we have establishments for the propagation of other game animals.

Science News-Letter, September 28, 1929

The Newest Locomotive

Invention

The cover illustration this week is of the replica of the famous English locomotive, the "Rocket," which has been made for the Ford Mus um at Dearborn, Mich. The following extracts from an article in a leading British engineering journal describe some of the circumstances under which it was made.

L. P. in *The Engineer*:

One of the pleasures of having more money than you know what to do with is that you may do things which others with a smaller coefficient of superfluity may or must regard as not worth while. America is the fortunate possessor of several such men, amongst whom is included Mr. Henry Ford. The world thinks of Mr. Ford as a hard-headed, very practical business man and nothing more. As a matter of fact, he is a complete American, by which we mean that he has a pronounced sentimental side to his character. Although the most up-to-date man in business that one could meet, it is amongst his ambitions to preserve the records of the past. He has saved old inns and houses from destruction by removing them bodily, and he has opened at Detroit a museum. He is also, we must add, the possessor of a railway, on which the British tradition of beautiful and well-kept rolling stock and locomotives is maintained. It is setting an example to American railways which till now have never paid any attention at all to the appearance of their engines. How far the fact that he is now a railway man is responsible for his desire to acquire a perfect replica of the "Rocket" of Rainhill for his museum, we cannot say; we only know that some months ago he instructed the original builders, Robert Stephenson and Co., Ltd., of Darlington—it used to be R. Stephenson and Co., and the works were then in Newcastle—to make one as like as two peas that which carried off the prize of £500 in 1829.

If, as we are sure it must have been, a pleasure to Mr. Ford to give a *carte blanche* order to Stephensons to build once again—for that is what it came to—the most famous locomotive in history, imagine what a pleasure it must have been to Stephensons to carry out that order. Figure for yourself the bustling and excitement in the office, the hunting up of old drawings and books and manuscripts, the questioning amongst old workpeople about the workshop methods of "Geordy's" day, the consultations with antiquarians of engineering, the arguments and debates about materials, and the anxious research into the great problem of the "Rocket"—her lost fire-box. Such opportunities do not come to a firm once in ten centuries. Museums have built models, replicas of a kind have been made of old machines, but never before, we believe, has an exact duplicate, duplicate as to methods, materials and mistakes, been constructed. It was not an easy thing to do, but it has been done, and it is possible to say, with almost absolute certainty, that the new "Rocket" is so like the first "Rocket" that its own father would not know them apart. . . .

In mechanical invention nothing ever happens just as you expect. Until a thing has been made and tried it is unsafe to say that it will work—or won't. Sometimes surprising success ensues, sometimes the least probable thing goes wrong. When one looks at the "Rocket" as she ran triumphantly at Rainhill and projects oneself backwards into the excitement of those October days, the heart comes into the mouth. Will she stay the course? Will the boiler burst, the seams open, the chimney fall, or the cylinders break bodily away from their doubtful hold upon the boiler? What a dreadful position, to our modern eyes, those cylinders are in! Not dreadful because of their inclination, though that offends us, but because they seem to be floating in the air, and at every stroke they wrench themselves to and fro, straining at the two stays and the few bolts which hold their entablatures to the flimsy fabric of the boiler. Look at the end view as it is given; remember that the cylinders are 3 ft. 7¾ in. center to center; notice the total absence of adequate support, and then ask yourself would you like to stand on a narrow footplate hurtling through the air at thirty miles an hour with your nose just between them. The prize well won, the Stephensons must have been glad enough to get their engine safely home and set about considering how to tie those cylinders more firmly to their base, though they appear to have been left where they were for many months. Mr. Goodall thinks that is why they were lowered to the almost horizontal position which they now occupy at South Kensington. It was not a flash of genius which anticipated the future and broke boldly from almost traditional vertical or steeply inclined positions, but the impulse of necessity. They *had* to be made fast; that was the first need. It was easy to do that by bringing them down from their exalted but precarious height. Earlier Stephenson engines, the famous "Lancashire Witch" amongst them, had inclined cylinders, but they were not designed for high speeds. The "Rocket" was different. We shall never know the truth of the matter. Down they came, and an engine which had a transcendent mechanical fault—you must see it to appreciate it—not only was improved out of recognition mechanically, but established once and for all the right attitude of the cylinders of locomotives. . . .

The "Rocket" runs like a motor car and calls for some of the same driving skill, which her new driver, inspired perhaps by the shade of Dewrance, has quickly acquired. Reversing is a tricky business. The gab rods have to be lifted off their pins, a pedal has to be pressed, and the gabs have to be dropped again upon their pins, all in proper sequence. It takes a little learning. . . .

The long U tube beside the chimney is the mercury pressure gauge. In the extended limb a wooden rod floats in the mercury and the upper end of it slides over a white board marked with the pressure.

The tender speaks for itself; a beautiful job with the horn plates and axle-boxes looking almost too good to be true. It is interesting, again, to notice the difference between the design of the woodwork—there were lots of expert cart builders—and the ironwork. The latter seems to be feeling its way, whilst the former was quite confident. The total absence of brakes is rather curious; one would have expected to find them on the tender at least. How did she stop when she ran light at 29½ miles per hour, just to show what could be done? . .

When one is developing an engine or machine it builds up under the hand. You can't make a general arrangement. Drawings of parts may be got out, but in the assembly modifications and alterations become necessary. So it was with the "Rocket"; she grew under the hands of her builders and no complete contemporary drawing exists. There are lots of drawings, but they were made subsequently and after modifications of this and that had been carried out. At last, through the fine spirit of Mr. Henry Ford and the devotion of the old firm, we know what the "Rocket" was like at Rainhill.

Punch Here to Fit SCIENCE NEWS-LETTER Binder Cover
Sent Postpaid for $2.00 Domestic, $2.50 Foreign